IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANTS:

Ronald COLEMAN

SERIAL NO.: **09/697,497** GROUP ART UNIT: **3691**

FILED: **October 27, 2000** EXAMINER: **AKINTOLA, Olabode**

TITLE: **METHOD AND SYSTEM FOR USING A BAYESIAN BELIEF NETWORK TO ENSURE DATA INTEGRITY**

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APPEAL BRIEF

Sir:

This is an Appeal Brief under 37 C.F.R. § 41.37 in response to a Final Office Action mailed November 25, 2008 and an Advisory Action mailed on April 1, 2009. Each of the topics required by Rule 41.37 is presented herewith and is labeled appropriately. The Notice of Appeal was filed on April 6, 2009.

(1) Real Party in Interest

The real party in interest is Citibank, N.A., 399 Park Avenue, New York, NY 10022.

(2) Related Appeals and Interferences

Appellant is unaware of any related appeals and interferences.

(3) Status of Claims

Claims 1-9 are pending in this application and stand under final rejection. Claims 10-20 have been previously withdrawn. The rejection of claims 1-9 is hereby appealed.

(4) Status of Amendments

There are no outstanding amendments.

(5) Summary of the Claimed Subject Matter

This summary of claimed subject matter is a concise explanation of the subject matter defined in independent claim 1. This is merely meant to be a summary and is in no way intended to limit the pending claims.

In one embodiment, as recited in claim 1, a method for identifying plausible sources of error in a risk assessment system (page 8, lines 9-14; Figure 3; page 3, lines 16-19) comprises identifying at least one variable of the risk assessment system (page 14, lines 2-10; page 12, lines 17-21); determining a first hypothesis about the at least one variable (page 15, lines 3-7; page 12, lines 17-21; page 17, lines 23-27); providing an initial probability of the first hypothesis about the at least one variable (page 12, lines 17-21; page 18, lines 10-16); identifying a change of value in the at least one variable of the risk assessment system (page 18, line 23 - page 19, line 2); determining by probabilistic induction at least one cause of the change of value in the at least one variable of the risk assessment system, wherein the at least one cause is a plausible source of error (page 9, lines 21-26; page 12, lines 17-21; page 32, lines 2-18); and evaluating the initial probability of the first hypothesis based on the at least one cause (page 31, lines 12-17; page 32, lines 2-18).

(6) Grounds of Rejection to be Reviewed on Appeal

A. Whether the Examiner's rejection of claim 1-9 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,542,905 to Fogel ("Fogel") in view of U.S. Patent No. 6,526,358 to Matthews ("Matthews") and further in view of U.S. Patent No. 6,192,360 to Dumais et al. ("Dumais") is proper.

(7) Argument

A. The Examiner's rejection of claims 1-9 under 35 U.S.C. § 103(a) as being unpatentable over Fogel in view of Matthews and further in view of Dumais is improper.

The Examiner improperly maintains the rejection of claims 1-9 in view of Fogel, Matthews, and Dumais. However, Fogel, Matthews, and Dumais, alone or in combination, fail

to teach "evaluating the initial probability of the first hypothesis based on the at least one cause," as recited in claim 1.

On page 3 of the Final Office Action mailed November 25, 2008, the Examiner acknowledges that "Fogel does not explicitly teach risk assessment system; providing an initial probability of the first hypothesis about the at least one variable, wherein the initial probability has a range greater than 0.0 and less than 1.0; and evaluating the initial probability based on the at least one cause." In order to cure this deficiency, the Examiner asserts that "Matthews teaches providing an initial probability of the first hypothesis about the at least one variable, wherein the initial probability has a range greater than 0.0 and less than 1.0 (col. 6, lines 43-39: *initial knowledge (a priori information) as to the probability of a fault occurring* ($P_{ap}(H_i)$)..); evaluating the initial probability of the first hypothesis based on the at least one cause (col. 6, lines 19-64)." In the Advisory Action, the Examiner repeats this assertion by reciting that "Matthews reference teaches providing an initial probability for the first hypothesis about at least one variable (col. 6, lines 43-49)." However, Matthews fails to cure Fogel's deficiencies.

The Examiner has still not shown how Matthews or any of the other cited references "evaluate" the initial probability of the first hypothesis. In contrast, the method in claim 1 recites evaluating the initial probability. "[T]he belief network 200 is first loaded with initial distributions or probabilities consistent with the state of knowledge prior to considering evidence." Page 18, lines 4-6. According to an embodiment and as similarly recited in claim 1, "the initial distributions of variables x and y are hypotheses." Page 18, lines 9-10. "The Bayesian belief network is now used to determine the probability of the null hypothesis for each variable." Page 19, lines 1-2. Once there is a change in the variable, claim 1 recites determining a cause of the change in value and "evaluating the initial probability of the first hypothesis."

Although Matthews recites "determining the highest probability hypothesis" and "calculat[ing] the probability that a particular fault has occurred," Matthews does not "evaluate" that probability calculation. *See* Col. 6, lines 19-64. And Matthews's determination of "the probability that a fault occurred" does not teach or suggest evaluating the initial hypothesis. In other words, using the example recited in Matthews, Matthews does not *evaluate* the "highest probability hypothesis."

Furthermore, Matthews's "hypothesis tester" does not "evaluate the initial probability of the first hypothesis," as recited in claim 1. "The hypothesis tester 58 utilizes a multiple

hypothesis statistical test to detect and isolate leaks and blockages. Specifically, the hypothesis tester 58 uses a Bayesian likelihood ratio test to select the hypothesis most likely to be true given the current value of the innovation vector." Col. 6, lines 21-26. In other words, the hypothesis tester chooses from a list of pre-determined hypotheses, but does not determine a first hypothesis and then evaluate the initial probability of the first hypothesis.

Dumais fails to cure the deficiencies of Fogel and Matthews. On page 3 of the Final Office Action, the Examiner asserts that "Dumais in the same field of art (Bayesian networks) teaches that this initial knowledge represents a prior probability assigned to a given hypothesis i (col. 3, lines 35-67)." However, Dumais does not teach "evaluating the initial probability of the first hypothesis based on the at least one cause," where the cause is a plausible source of error of the change of value in the at least one variable of the risk assessment system. Instead, Dumais "briefly introduces" a Bayesian network. But Dumais's recitation is not sufficient to satisfy the *prima facie* case of obviousness.

Thus, neither Fogel, Matthews, nor Dumais, alone or in combination, teaches or suggests "evaluating the initial probability of the first hypothesis based on the at least one cause," as recited in claim 1. Because independent claim 1 is patentable over Fogel, Matthews, and Dumais for the reasons stated above, claims 2-9 are patentable over the cited art for the same reasons stated above. Therefore, the undersigned representative respectfully requests that the Examiner withdraw the rejection of claims 1-9 under 35 U.S.C. § 103(a).

(8) Claims Appendix

1. (Previously Presented) A method for identifying plausible sources of error in a risk assessment system, comprising:

identifying at least one variable of the risk assessment system;

determining a first hypothesis about the at least one variable;

providing an initial probability of the first hypothesis about the at least one variable;

identifying a change of value in the at least one variable of the risk assessment system;

determining by probabilistic induction at least one cause of the change of value in the at least one variable of the risk assessment system, wherein the at least one cause is a plausible source of error; and

evaluating the initial probability of the first hypothesis based on the at least one cause.

2. (Original) The method of claim 1, wherein the at least one variable of the risk assessment system comprises input data of the risk assessment system.

3. (Original) The method of claim 1, wherein the at least one variable of the risk assessment system comprises output data of the risk assessment system.

4. (Original) The method of claim 1, wherein the at least one variable of the risk assessment system comprises data external to the risk management system but related to the risk assessment system.

5. (Original) The method of claim 1, wherein the risk assessment system comprises a pre-settlement exposure server.

6. (Original) The method of claim 1, wherein the at least one variable of the risk assessment system comprises observable information.

7. (Original) The method of claim 1, wherein the at least one variable of the risk assessment system comprises a plurality of variables, and wherein a first one of the plurality of variables implicates a second one of the variables.

8. (Original) The method of claim 1, wherein determining a first hypothesis about the at least one variable comprises:

hypothesizing that the at least one variable has not changed in value.

9. (Original) The method of claim 1, wherein providing an initial probability of the first hypothesis comprises:

providing a prior probability of the at least one variable; and

providing an initial conditional probability of the at least one variable.

10. (Withdrawn) A method for identifying plausible sources of error in a financial risk assessment (FRA) system, comprising:

identifying a plurality of variables of the FRA system;

implementing a Bayesian network to represent implications between and among the plurality of variables;

generating an initial probability for each of the plurality of variables of the FRA system;

extracting observed data from one of the plurality of variables of the FRA system;

determining an evidentiary finding based on the extracted factual data from the one of the plurality of variables of the FRA system; and

assessing the initial probability for the one of the plurality of variables of the FRA system based on the evidentiary finding.;

11. (Withdrawn) The method of claim 10, wherein the Bayesian network comprises a plurality of nodes corresponding to the plurality of variables.

12. (Withdrawn) The method of claim 11, further comprising:

assigning each one of the plurality of network nodes to one of the plurality of variables; and

assigning an initial probability to at least one of the plurality of network nodes;

13. (Withdrawn) The method of claim 10, wherein the plurality of variables comprise input data of the FRA system.

14. (Withdrawn) The method of claim 10, wherein one of the plurality of variables comprises information implicated from input data of the FRA system.

15. (Withdrawn) The method of claim 10, wherein the Bayesian network is implemented by a software having an applications program interface and a graphical user interface.

16. (Withdrawn) The method of claim 10, wherein generating the initial probability for each of the plurality of variables of the FRA system comprises:

setting each of the plurality of variables to a hypothesized state;

generating an initial probability for each of the plurality of variables in the set hypothesized state.

17. (Withdrawn) The method of claim 10, wherein the observed data comprise bias data and fact data about the one of the plurality of variables of the FRA system.

18. (Withdrawn) The method of claim 10, wherein extracting observed data from one of the plurality of variables of the FRA system comprises:

observing data from the one of the plurality of variables of the FRA system;

storing the observed data in a server archive; and

extracting the stored data out of the server archive.

19. (Withdrawn) A computerized system for identifying minimizing sources of error in a risk assessment system (RAS), comprising:

an application program interface (API) receiving a plurality of variables of the RAS and an initial probability for each of the variables and implementing a Bayesian network to represent implications between and among the plurality of variables;

a first module accessing the API to retrieve beliefs based on the implications between and among the plurality of variables

a second module receiving the beliefs from the first module and interpreting the beliefs;

a third module receiving prospects based on the interpretation of the beliefs from the second module and converting the prospects to factoids based on additional data received; and

a fourth module receiving the factoids from the third module and weighing the factoids to evaluate the initial probability for each of the variables.

20. (Withdrawn) The computerized system of claim 19, further comprising:

a data extracting module extracting the additional data used by the third module for converting the prospects to factoids.

(9) Evidence Appendix

None.

(10) Related Proceedings Appendix

None.

CONCLUSION

The undersigned representative respectfully submits that this application is in condition for allowance, and such disposition is earnestly solicited. If the Examiner believes that the prosecution might be advanced by discussing the application with the undersigned representative, in person or over the telephone, we welcome the opportunity to do so. In addition, if any additional fees are required in connection with the filing of this response, the Commissioner is hereby authorized to charge the same to Deposit Account No. 50-4402.

Respectfully submitted,

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